ENTOMOLOGY.—*The stridulations of some crickets in the Dominican Republic.*

H. A. Allard, Arlington, Va.

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While residing in the Dominican Republic from November 3, 1945, to February 7, 1946, and again from September 10, 1947, to January 29, 1948, for the purpose of collecting insects and plant material for the Smithsonian Institution, I was always much impressed with the insect sounds around me. There were many new and distinctive cricket notes, but there was rarely any great din of blending insect music such as one hears in August around Washington, D. C., when large colonies of snowy tree crickets, *Oecanthus niveus* DeGeer, and the true katydids, *Pterophylla camellifolia* Fabricuis, become musical.

In the Dominican Republic when the warm and humid evening arrives, scattered chirping and tinkling notes issue from the shrubs and trees here and there. Some of these are clear, incisive little points of high-pitched sound; others are powerful, penetrating, buzzing, almost ringing noises, continuous and even very disconcerting to many people because of the incessant din.

In the capital city, Ciudad Trujillo, the large brown cricket *Anurogryllus muticus* (DeGeer) is very common and noisy throughout the winter. As soon as night came on and lights appeared, these ubiquitous crickets began their activities out-of-doors in the yard and even within the wide-open houses, for there are no screened windows or doors in the typical Spanish houses.

The song of the males of this cricket, here, is a continuous ringing z-z-z-z-z-z of tremendous volume and penetration which practically fills a room with veritable din. The song is quite like that of our common cone-head, *Neoconocephalus robustus crepitans* (Scudder) of the eastern United States. After being accustomed to hear the trilling notes, definitely musical in tonality, of our American individuals of this species, I was somewhat nonplussed to hear this tropical[1] cricket singing continuously, with all the characteristics of a cone-headed katydid, and with no tonality in its stridulation. I kept a close eye on this common, ubiquitous species, and one evening I thought I heard weak fluttering notes produced by a female of the species perched on a jutting coral rock entering into the construction of the outer wall of the house or portico. I very carefully studied this cricket, for it was not very wary, and sure enough this female also had musical inclinations. Spreading the elytra slightly it expanded the long membranous underwings and set them in rapid vibration, thus producing a weak fluttering sound. These sounds were probably never consciously heard by ordinary untrained ears. A life-long association with the musical habits of Orthoptera made it consciously audible to me at once.

My first acquaintance with *Anurogryllus muticus* was early in June 1941 at Clarendon, Va., across the Potomac River from Washington, where I had located a large colony in a pine grove here. The crickets of this colonly appeared to be more or less arboreal and were always seen on the trunks of the pines from one foot to eight feet above the ground. Their stridulation, which I described in a paper "Some Musical Orthoptera at Clarendon, Virginia," Can. Ent. **48:** 356–358, 1916, was nothing like that of individuals of this species stridulating in the Dominican Republic. The Virginia crickets, it is true, stridulated with a continuous "song," but it was a high-pitched trill with a definite tonality, and at first lead me to believe it was the trilling of a tree cricket, *Oecanthus nigricornis* or *O. nigricornis quadripunctatus*. Why many of our crickets and katydids stridulate so differently in different regions of their range has never been satisfactorily explained, although such variations of behavior have been more than once observed. Weak musical impulses by the females have been given some attention, and it is known

[1] The writer is indebted to Dr. Ashley B. Gurney of the Entomology Research Branch of the United States Department of Agriculture for all identifications.

that the females of many species, perhaps generally, produce weak, almost inaudible sex calls, for the males in the vicinity appear to be exceedingly sensitive and alert to these. I have heard the females of various species of katydids make their distinctive clicks, and have noted males flying toward their position at once. This notifying click or snap of the females, rather than the incessant chirping and buzzing of the males, appears to be the most distinctive call-note functioning to bring the sexes together. I have never seen the females particularly interested in the ceaseless noisy demonstrations of the males, but often I have seen the males flying in from all directions when a female of the species delivered her weak, alluring wing-clicks.

On the night of December 10, 1945, at Ciudad Trujillo, I ran down an intermittent, high-pitched tinkling chirp localized in the foliage of an Ixora bush (*Ixora coccinea* L.). This cricket proved to be a species of *Orocharis*, probably *O. similis*, as tentatively identified, owing to insufficient knowledge of West Indian species.

In the garden near by on this same evening I heard high-pitched, intermittent chirping notes reminding me somewhat of our common black field crickets of the States, *Gryllus assimilis* Burmeister. I traced these notes to the inside concrete walls of a large, empty, unused lily pond, and captured several males here. These proved to be odd little crickets of the genus *Amphiacusta*. The species cannot at present be definitely named, and these specimens may be new to entomological science. The crickets of this genus must be much more extensively collected and studied throughout the West Indies before they can be identified or named with any certainty, according to Dr. Ashley B. Gurney.

A dainty tree cricket, a species of *Oecanthus*, was captured in some weeds near the American Embassy one December night. As soon as darkness came on its high-pitched, clear, tinkling chirp was always to be heard. These crickets were not localized in colonies but advertised their presence only as occasional "singers" here and there. When the evening temperatures were high, around 75°–79°F., the cricket chirped with a clear, incisive tonality, but always with a very leisurely delivery. If the temperature fell to near 65°–68°, its chirps became more prolonged and uncertain, with a more pronounced tremulous character. It was interesting to note that even though the mean temperatures around Ciudad Trujillo are always high, around 79°–80°F., with the average minima around 70°–71°F., an especially cool evening with temperatures around 65° was relatively cold to these crickets as it was to human beings long adjusted to these temperature levels.

Table 1.—Temperature and Chirping ates

Date 1947	Time p.m.	Temperature Outside, F.	Chirps per minute	Humidity
Oct. 19	10:15	72°	18	—
22	9:30	73°	20	88%
24	11:00	72°	18	—
27	11:30	71°	20	—
31	10:00	75°	20	—
Nov. 1	9:40	77°	22	90%
3	9:30	75°	20	Breeze from N.
4	10:00	75°	20	Wind cool N.
8	9:00	73.5°	19	Cool N. wind
9	8:15	71°	18	
9	10:00	70°	silent	
10	9:30	70°	18	
10	10:30	69°	18	
15	9:45	74°	20 (another)	
16	10:45	66° (cool, dry)	16	Very cool, first night for sheet on bed all night.
24	10:30	70°	18	
25	10:30	68°	silent	
Dec. 8	10:40	71°	16	

66°	68°	69°	70°	71°	72°	73°–73.5°	74°	75°	77°
16	silent	18	silent	20	18	20	20	20	22
			18	18	18	19		20	
			18	16				20	

Table 1 presents the observed rates of chirps per minute in relation to different temperature of an *Oecanthus niveus* identified as such by Dr. A. B. Gurney, until further studies could be made.

It is interesting to note that our snowy tree crickets—*Oecanthus niveus*, based on the observations of A. E. Dolbear ("The Cricket as a Thermometer." Amer. Nat. **31:** 790–791, 1897), chirp at a much faster rate than this Dominican species resembling *O. niveus* as determined by the usual morphological characters. As a matter

of fact, our northern *Oecanthus niveus* at a temperature of 70°F. chirped at a rate of 120 times per minute, and even at 60° the rate was 80 times per minute. On the basis of their chirping there is some question whether the West Indian crickets are *Oecanthus niveus*, although this species may also occur here. If so its temperature relations in this tropical climate have undergone a most remarkable change, with a drop of chirping rate of 120 at 70°F. to complete indisposition to chirp at this temperature, or at least to deliver not more than 18 chirps per minute. Even at 77° the highest temperatures of the chirping rates observed in the Dominican Republic, the chirps were only 22 times per minute.

It is at once obvious that the formula $T = 50 + \frac{100 - 40}{4}$ devised by Dolbear for our race of *Oecanthus niveus* will not apply at all to this tropical species. As derived from this formula, if our crickets were chirping at the rate of 100 times per minute, the air temperature should be $50 + \frac{100 - 40}{4} = 65$°F. If the tropical cricket observed in the Dominican Republic is *Oecanthus niveus*, its physiology has undergone a remarkable change with respect to its temperature sensitivity. On the basis of its stridulations this *Oecanthus* may prove to be an entirely different species rather than a greatly modified tropical race of the common snowy tree cricket *Oecanthus niveus*. Dr. A. B. Gurney is at present engaged in a critical study of this species.

MEMBER HONORS

Frank W. Reinhart, chief of the Plastics Section at the National Bureau of Standards, has been awarded the Department of Commerce Silver Medal for Meritorious Service. The award recognized his "major contributions to the science and technology of plastics, and for highly distinguished authorship." Mr. Reinhart, a nationally known authority in the field of plastics, directs the Bureau's diverse research, development, and testing program on plastics, plastic coatings, and adhesives. Among the recent developments of this program are plastic springs which have a higher strength-to-weight than most metal springs, improved transparent eyeshields for the military, and a shatter and craze resistant plastic for use in combat aircraft.

Alan T. Waterman, director of the National Science Foundation, has received the first annual Captain Robert Dexter Conrad award of the Office of Naval Research. The award has been established to recognize outstanding technical and scientific achievements in research and development for the Navy. It is named for Captain Conrad, who, as first head of the Planning Division of ONR, was the primary architect of the Navy's basic research program. The citation, signed by the Secretary of the Navy, reads as follows: "For your outstanding contribution to the organization and long-range scientific objectives of scientific research administration in the Navy. For your vision and leadership in the successful establishment of new concepts and programs in Naval Science. For your personal and exemplary dedication to the building of a solid foundation for the role of the Office of Naval Research in the modern Navy, thereby creating a permanent benefit to the National Defense."

Ray P. Teele has been elected an Affiliate Member of the Institute of Traffic Engineers, being the only person so honored during 1957. "An affiliate, at the time of admission, shall be a person who, by scientific achievement or practical experience, has attained a position in his special field qualifying him to cooperate with traffic engineers in the advancement of engineering knowledge and practice."

Joseph Kaplan has been elected to membership in the National Academy of Sciences.